



**Minnesota Pollution  
Control Agency**

520 Lafayette Road North  
St. Paul, MN 55155-4194

# UST Cathodic Protection System Evaluation Galvanic (Sacrificial Anode) Type Underground Storage Tanks (UST) Program

Doc Type: Compliance Certification

✓ **Instructions:** Within 30 days, send completed form to Joann Henry, Minnesota Pollution Control Agency (MCPA) at the address above, fax to 651-297-2343, or e-mail [joann.henry@state.mn.us](mailto:joann.henry@state.mn.us).

- All reports must be submitted regardless of results (pass, fail, or inconclusive)
- Incomplete, unsigned, or illegible forms will not be accepted and will be returned.

**1. UST facility**

MPCA Site ID #:

Name: Morning Star Market  
Address: 104 North Main Street  
City: Wahkon MN Zip code: 56386  
County: Miller Lacs Phone: \_\_\_\_\_

**2. UST owner/operator**

Name: \_\_\_\_\_  
Address: \_\_\_\_\_  
City: \_\_\_\_\_ State: \_\_\_\_\_  
Zip code: \_\_\_\_\_ Phone: \_\_\_\_\_  
Contact name (if different than above): \_\_\_\_\_ Contact phone: \_\_\_\_\_

**3. Cathodic Protection (CP) tester information and qualifications**

Tester name (print): Jim Pomrenke Company name: Bennett Petroleum Service, Inc.  
Address: P.O. Box 727, 1300 29th Ave. NE City: Sauk Rapids  
State: MN Zip code: 56379 Phone: 320-252-6816 E-mail: bennettpetroleumservice@cloudnet.  
National Association of Corrosion Engineers (NACE) international certification #: \_\_\_\_\_ Steel Tank Institute (STI) certification #: CP 816-13

**4. Reason survey was conducted (check only one)**

- ☒ Routine - 3 years ☐ Routine - within 6 months of install ☐ 30-day re-survey after fail ☐ Re-survey within 6 months of repair/modification  
Date next CP survey must be conducted by (mm/dd/yyyy): 8/20/2018 (Required within 6 months of install or repair, and every 3 years thereafter.)

**5. CP tester's evaluation (check only one)**

- ☒ **Pass** All protected structures at this facility pass the CP survey and the continuity survey indicates all protected structures are isolated. It is judged that adequate CP has been provided to the UST system (Complete sections 7 and 8).  
☐ **Fail** One or more protected structures at this facility fail the CP survey, and it is judged that adequate CP has not been provided to the UST system. (Complete sections 7 and 8).  
☐ **Inconclusive** The remote and the local do not both indicate the same test result on all protected structures (both pass or both fail), or the continuity survey indicates continuous or inconclusive results when compared to non-protected structures, the survey must be evaluated by a corrosion expert (Corrosion Expert to complete section 6).

CP Tester Signature: Jim Pomrenke Date CP survey performed (mm/dd/yyyy): 8/20/2015

**6. Corrosion expert's evaluation (if applicable)**

The attached survey must be conducted and/or evaluated by a corrosion expert when: a) conducting repairs to metallic structures which are non-factory coated with dielectric material; b) adding supplemental anodes to the tanks and/or piping without following accepted industry standards; c) the local and remote structure-to-soil potential did not result in the same outcome (both pass or both fail); d) the continuity survey indicates one or more of the protected structures are not isolated; e) when required by MPCA (Corrosion Expert to complete sections 7 and 8).

- ☐ **Pass** All protected structures at this facility have been judged that the adequate CP is provided to the UST system.  
☐ **Fail** One or more protected structures at this facility fail the CP survey and it is judged that adequate CP has not been provided to the UST system.

Corrosion expert's name (print): \_\_\_\_\_ Phone: \_\_\_\_\_  
Company name: \_\_\_\_\_  
NACE Int./PE certification: \_\_\_\_\_ NACE Int./PE certification #: \_\_\_\_\_  
CP Expert Signature: \_\_\_\_\_ Date (mm/dd/yyyy): \_\_\_\_\_

**7. Criteria applicable to evaluation (check all that apply)**

- ☒ **-850 On** Structure-to-soil potential more negative than -850 millivolts (mV) with the protective current applied.  
☐ **-850 Off** Structure-to-soil potential more negative than -850 mV with the protective current momentarily interrupted. ("Instant Off")  
☐ **100 mV** Structure tested exhibits at least 100 mV of cathodic polarization. ("Instant Off" readings minus native/depol readings)

Facility name: Morning Star Market Date of test (mm/dd/yyyy): 8/20/2015  
(Note: The facility name and date of test will automatically populate from page one, if filled out electronically.)

**8. Action required as a result of this evaluation (check only one)**

- ☒ **None** CP is adequate. No further action is necessary at this time. Test again by no later than (see Section 4).  
☐ **Retest** CP may not be adequate. Retest within 30 days to determine if passing results can be achieved. (Retests may occur only if all protected structures are isolated from non-protected structures)  
☐ **Repair & Retest** CP is not adequate. Repair/modification is necessary within the next 60 days, or permanently close the tank system.

**9. CP system repairs and/or modification information**

Date of "failing" test: \_\_\_\_\_ Date of repair: \_\_\_\_\_ Repair company: \_\_\_\_\_  
(mm/dd/yyyy) (mm/dd/yyyy)

Name of lead repair technician: \_\_\_\_\_

Phone # \_\_\_\_\_

Certification of repair technician (check all that apply): ☐ Steel Tank Institute ☐ NACE ☐ MPCA certified supervisor

Note: submit failing test results with this report if not already submitted.

**Description of Repairs (check all that apply)**

- |  |   |
|--|---|
| <input type="checkbox"/> 1. Supplemental anodes for a sti-P <sub>3</sub> ® tank.   | Repairs/modifications for 1 & 2 must be designed by a "corrosion expert" or installed per industry standards. Attach corrosion experts design, or documentation industry standard was followed. (Section 6 must be signed if designed by a corrosion expert.) |
| <input type="checkbox"/> 2. Supplemental anodes for metallic pipe which is factory coated with dielectric material (fusion bonded epoxy or equivalent).              |   |
| <input type="checkbox"/> 3. Supplemental anodes for a non-sti-P <sub>3</sub> ® tank. (e.g., bare steel).   | Repairs/modifications for 3 & 4 must be designed and evaluated by a corrosion expert only. Attach a corrosion experts design. (Section 6 must be signed.)   |
| <input type="checkbox"/> 4. Supplemental anodes for metallic pipe which is non-factory coated with dielectric material (e.g., galvanized, copper, bare steel, etc.). |   |
| <input type="checkbox"/> 5. Isolation of Galvanically protected tanks/piping. (explain in "remarks/other" below).  |   |
| <input type="checkbox"/> 6. Isolation of non-protected metal pipe segments (e.g., flex connectors) at STP or dispenser sumps (explain in "remarks/other" below).     |   |

Remarks/Other: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**10. Galvanic (sacrificial anode) structure to soil potential and continuity survey**

**Half Cell Placement (testing) on frozen soil, concrete, asphalt, or other paving materials is not acceptable.**

**Structure to Soil Potentials:**

- The half cell must be placed in a minimum of **three locations per tank, and three locations per piping run**. At least one of the reference cell locations must be in the soil directly over the tested structure (local); and at least one must be placed in soil approximately 25 to 100 feet away from the structure (remote). The third location is at the discretion of the tester (either local or remote).
- When testing flex connectors only, **two tests points are required for each flex connector**, one local and one remote.
- Both the local and the remote voltage must meet one of the three criteria listed in section 7 in order for the structure to pass. Inconclusive must be indicated when both the local and the remote structure-to-soil potentials do not result in the same outcome (both pass or both fail).
- If the "-850 mV Off" or the "100 mV Polarization" criteria is used for galvanic systems, record structure-to-soil potential readings on the MPCA Impressed Current data sheet or similar form.

**Continuity Testing: (Point-to-Point and/or Fixed Cell-Moving Ground)**

- Point-to-Point: When conducting this method, the leads of the volt meter are required to contact the two structures being examined to demonstrate isolation or continuity. A half cell is not used for this test method.
- Fixed Cell-Moving Ground: When conducting this method, the half cell must be placed in the soil at a **remote** location approximately 25 to 100 feet away and left undisturbed. The other lead of the meter is moved to structures being evaluated.
- To interpret continuity data for either method compare the difference in voltage of the structures evaluated and use the following guidelines: 1 mV or less = continuous, 1-10 mV = inconclusive, greater than 10 mV = isolated.
- For galvanic systems, the structure that is to be protected must be isolated from all other non-protected metallic structure in order to "pass" the continuity survey.
- If other approved continuity testing methods are used, alter this form or submit the data on a separate sheet.

Facility name:

MorningStar Market

Date of test (mm/dd/yyyy):

8/20/2015

(Note: The facility name and date of test will automatically populate from page one, if filled out electronically.)

Describe soil type and location(s) of remote reference cell placement(s) (e.g., Black Dirt, 30 feet NW of Tank #1 spill bucket):

Remote location #1:

Remote location #2:

Describe soil type(s) of local reference cell placements:

## Structure to soil potentials (mV)

## Continuity testing (mV)

	Half cell site map code	Half cell placement description	"ON" Voltage	Structure tested	Point-to-point voltage	Fixed cell remote voltage	Isolated/Continuous/Inconclusive
Structure: (Example) Tank 1	(Ex)1	Local, soil at ATG manway	-1011 mV	(Ex) ATG Conduit	475 mV		isolated
	(Ex)2	Local, Soil at STP manway	-995 mV	(Ex) STP conduit		-528 mV	isolated
	(Ex)R-1	Remote #1	-1042 mV	(Ex) Vent	421 mV		isolated
	Structure contact point(s): (Ex) Tank Bottom			(Ex) Fill Riser	375 mV	-522 mV	isolated
	Overall Structure Results (Structure to soil potentials and continuity): <input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> Inconclusive						

Unlead -  
Premium  
tank  
(compartment):

Structure:	1	Unlead ATG manhole	-1000 mV	ATG conduit	390 mV		isolated
	2	Unlead 2 ATG manhole	-905 mV				
	3	Remote - grass area 30ft east	-905 mV				
	Structure contact point(s): tank bottom - fill						
	Overall Structure Results (Structure to soil potentials and continuity): <input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> Inconclusive						

Unlead 2  
tank

Structure:	1	Unlead ATG	-1175 mV	ATG conduit	565 mV		isolated
	2	Unlead 2 ATG	-1080 mV				
	3	Remote - grass area 30ft east	-1080 mV				
	Structure contact point(s): tank bottom - fill						
	Overall Structure Results (Structure to soil potentials and continuity): <input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> Inconclusive						

Unlead  
1-2  
suction  
pipe

Structure:	1	Unlead ATG	-1565 mV	ATG conduit	955 mV		isolated
	2	Unlead 2 ATG	-1470 mV				
	3	Remote - grass area 30ft east	-1470 mV				
	Structure contact point(s): pump 1-2						
	Overall Structure Results (Structure to soil potentials and continuity): <input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> Inconclusive						

Premium  
1-2  
suction  
pipe

Structure:	1	Unlead ATG	-1565 mV	ATG conduit	955 mV		isolated
	2	Unlead 2 ATG	-1470 mV				
	3	Remote - grass area 30ft east	-1470 mV				
	Structure contact point(s): pump 1-2						
	Overall Structure Results (Structure to soil potentials and continuity): <input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> Inconclusive						

Structure:

Structure:							
	Structure contact point(s):						
	Overall Structure Results (Structure to soil potentials and continuity): <input type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> Inconclusive						

Facility name: Morning Star Market Date of test (mm/dd/yyyy): 8/20/2015  
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**Structure to soil potentials (mV)**

**Continuity testing (mV)**

Unlead  
3-4  
disp  
pipe

Structure:

Premium  
3-4  
dispenser  
pipe

Structure:

Unlead-  
Unlead 2  
siphon  
pipe

Structure:

Structure:

Half cell site map code	Half cell placement description	"ON" Voltage	Structure tested	Point-to-point voltage	Fixed cell remote voltage	Isolated/Continuous/Inconclusive
1	Unlead ATG	-1640mV	ATG conduit	1030mV		isolated
2	Unlead 2 ATG	-1545mV				
3	Remote-grass area 30 ft east	-1545mV				
Structure contact point(s):						
Overall Structure Results (Structure to soil potentials and continuity): <input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> Inconclusive						
1	Unlead ATG	-1640mV	ATG conduit	1030mV		isolated
2	Unlead 2 ATG	-1545mV				
3	Remote-grass area 30 ft east	-1545mV				
Structure contact point(s):						
Overall Structure Results (Structure to soil potentials and continuity): <input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> Inconclusive						
1	Unlead ATG	-1640mV	ATG conduit	1030mV		isolated
2	Unlead 2 ATG	-1545mV				
3	Remote-grass area 30 ft east	-1545mV				
Structure contact point(s): Unlead 2 SIP manhole						
Overall Structure Results (Structure to soil potentials and continuity): <input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> Inconclusive						
Structure contact point(s):						
Overall Structure Results (Structure to soil potentials and continuity): <input type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> Inconclusive						
Structure contact point(s):						
Overall Structure Results (Structure to soil potentials and continuity): <input type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> Inconclusive						

Comments/Remarks:

If separate corrosion protection is required on flex connectors, treat each flex as if it were an individual metal pipe.

Attach additional sheets as needed.

# 11. Description of UST system

Tank/ Pipe #	Product	Capacity (Gallons)	Tank type <sup>1</sup>	Piping type <sup>2</sup>	Metal Segments at Tank sump <sup>3</sup>	Metal Segments at Dispenser <sup>3</sup>
1	Unleaded/Premium	6000/4000	STIP SW	steel/anodes		
2	Unleaded	4000	STIP SW	steel/anodes		
3	suction unl 1-2		coated	steel/anodes		
4	suction prem 1-2		coated	steel/anodes		
5	STP unl 3-4		coated	steel/anodes		
6	STP prem 3-4		coated	steel/anodes		
Ex:	Premium	10,000	SW sti-P <sub>3</sub> <sup>®</sup>	DW Fiberglass	CP w/ anodes	In Containment

1. Indicate if tank is Double Wall (DW) or Single Wall (SW). Also indicate type (e.g., steel, fiberglass, sti-P<sub>3</sub><sup>®</sup>, composite etc.). Also indicate if tank is compartmental if applicable
2. Indicate if piping is Double Wall (DW) or Single Wall (SW). Also indicate type (e.g., coated steel, fiberglass, galvanized, flex, etc.).
3. Indicate how metal segments such as flex connectors or metal pipe segments are protected from corrosion (e.g., isolated, booted, bonded, CP w/anodes, in containment, etc.)

# 12. UST facility site drawing

Attach detailed drawing or use the space provided to draw a sketch of the UST and CP systems. At a minimum you should indicate the following: All tanks, piping and dispensers; Location of anodes if known; All buildings and streets; Location of CP test stations; Each reference cell placement (local and remote) must be indicated by a code (e.g., 1,2, T-1,) corresponding with the appropriate test in Section 10 of this form. If supplemental anodes are added to the tank system, indicate number, size, location and depth of the new anodes. **An evaluation of the CP system is not complete without an acceptable site drawing.**

